REMARKS

Claims 1-12 and 22 are pending in this application. By this Amendment, claim 12 is amended and claim 22 is added. The amendments and features recited in the added claim introduce no new matter. The amendment to claim 12 is purely administrative, the antecedent basis for the feature the fiducial-mark-image taking device being recited in claim 5. Support for the subject matter of new claim 22 is available in at least claims 1-3 as previously filed. Reconsideration of the rejections based on the above amendments and the following remarks is respectfully requested.

The Office Action, in paragraph 5, indicates that claims 5-12 are allowed. Further, the Office Action, in paragraph 4, indicates that claims 2-4 would be allowable if rewritten in independent form. Applicants appreciate the allowance of claims 5-12 and the indication of allowability of claims 2-4. Applicants respectfully submit that claim 1, however, is allowable for at least the reasons discussed below.

The Office Action, in paragraph 3, rejects claim 1 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,541,834 to Tomigashi et al. (hereinafter "Tomigashi"). This rejection is respectfully traversed.

Tomigashi discloses, with reference to Fig. 1, a component mounting apparatus having a suction nozzle 1 movable with a component 11 held attracted thereto to mount the component 11 in a mounting position 13 on a board 12; a CCD camera 4 for taking images of the component 11 and the mounting position 13 obliquely from above when the suction nozzle 1 has been brought to above the mounting position with the component 11 held attracted thereto; and an image processing circuit 6 for calculating the deviation of the position of the component 11 relative to the mounting position 13 based on image signals from the camera 4 (Abstract). The Office Action relies on the disclosure at col. 7, lines 6-10 of Tomigashi, as

teaching detecting, on a position-detecting plane including the component-mounting surface of the circuit substrate, the position of the rotation axis of the suction nozzle.

Applicants respectfully submit that the cited portions of Tomigashi do not disclose any detecting step but rather state that, based on previously detected deviations, step S7 calculates the amount the suction nozzle 1 is to be moved for correction to reduce the deviation to the permissible range. The suction nozzle 1 is moved for correction in step S8, whereupon the sequence returns to step S3. Subsequently, as is taught at col. 7, lines 11-14 of Tomigashi, when the deviations are found to be within the permissible range in step S6, step S9 follows in which the suction nozzle 1 is lowered vertically to mount the component on the printed board. The Office Action then goes on to assert that, at col. 5, lines 7-12, Tomigashi teaches the position-detecting plane being co-planar with the component-mounting surface of the circuit substrate. However, this passage from Tomigashi actually reads "the suction nozzle 1 is thereafter lowered by the lift mechanism to a level at which images can be taken by the camera 4 of a row of leads 16 of the component 11 and a row of pads 17 on the printed board 12 at the same time, for example, to a level 0.5 mm above the board" (emphasis added). Because this lowering toward the substrate occurs after the alleged position detecting step (which is actually not even a position detecting step as discussed above), it is clear that the alleged "detecting" does not occur in a plane that is co-planar with a component-mounting surface of the substrate.

Claim 1 recites, among other features, a method of detecting a position of a rotation axis of a suction nozzle of an electric-component mounting apparatus … comprising: detecting, on a position-detecting plane including the component-mounting surface of the circuit substrate, the position of the rotation axis of the suction nozzle, wherein the position-detecting plane is co-planar with the component-mounting surface of the circuit substrate. Applicants respectfully submit that Tomigashi does not teach or suggest detecting a position of a rotation axis of the suction nozzle. Rather, as discussed above, Tomigashi teaches detecting the deviation of the

position of the component 11 relative to the mounting position 13. Tomigashi, in fact, includes among the errors, which may be introduced in the position, that the position of the component 11 generally involves an error of ±40 μm relative to the specific mounting position on the board 12. This error includes deviations Δx and Δy in the direction of x-axis and the direction of y-axis on a horizontal plane, and an error $\Delta\theta$ involved in the angle of rotation about the center axis of the suction nozzle 1. As such, Applicants respectfully submit that Tomigashi does not teach or suggest detecting a position of the center axis of the suction nozzle but rather would likely use a default value (or a design value) as a position of the center axis of the nozzle based on the other measurements which are made.

Additionally, as discussed further above, Tomigashi teaches detecting the deviation of the position of the component 11 relative to the mounting position 13, when the suction nozzle 1 is positioned above the mounting position 13 of the board 12 rather than on a position-detecting plane which is co-planar with a component-mounting surface of a circuit substrate as is recited, among other features, in claim 1. Thus, it is clear that Tomigashi does not disclose the "co-planar" feature.

Applicants, therefore, respectfully submit that Tomigashi cannot be reasonably read to teach, or even to have suggested, the specific features enumerated in independent claim 1. Accordingly, reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §102(b) as being anticipated by Tomigashi are respectfully requested.

Claim 22 is prepared by adding to claim 1, as previously presented, a number of features which are supported at least by claims 2 and 3 as originally filed. In the method recited in claim 22, the step of positioning the suction nozzle may not require moving the suction nozzle before or after the suction nozzle is rotated by the predetermined angle. That is, claim 22 would be readable on a method in which the suction nozzle is rotated about the rotation axis thereof by
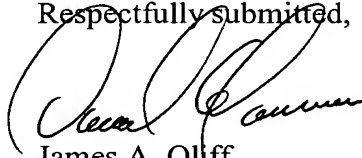
the predetermined angle in a state in which the free end of the suction nozzle is positioned substantially on the position-detecting plane (see, e.g., claim 2).

Applicants respectfully submit that Tomigashi does not teach or suggest the subject matter of claim 22. In particular, the step of rotating the suction nozzle about the rotation axis thereof, the step of positioning the suction nozzle, before and after being rotated, such that the free end of the suction nozzle is positioned substantially on the position-detecting plane co-planar with the component-mounting surface of the circuit substrate and the step of detecting, on the position-detecting plane, the position of the rotation axis of the suction nozzle, by utilizing the rotating and positioning of the suction nozzle, are neither taught, nor would they have been suggested, by the teachings of Tomigashi.

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1 and 22, in addition to the allowance of claims 5-12 and the indicated allowable subject matter of claims 2-4, are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,

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Date: January 12, 2005

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